

"Probing the Accretion Geometry of Black Holes with X-Ray Polarization"

In the coming years, new space missions will be able to measure X-ray polarization at levels of 1% or better in the $\sim 1\text{--}10$ keV energy band. In particular, X-ray polarization is an ideal tool for determining the nature of black hole (BH) accretion disks surrounded by hot coronae. Using a Monte Carlo radiation transport code in full general relativity, we calculate the spectra and polarization features of these BH systems. At low energies, the signal is dominated by the thermal flux coming directly from the optically thick disk. At higher energies, the thermal seed photons have been inverse-Compton scattered by the corona, often reflecting back off the disk before reaching the observer, giving a distinctive polarization signature. By measuring the degree and angle of this X-ray polarization, we can infer the BH inclination, the emission geometry of the accretion flow, and also determine the spin of the black hole.